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The Impact of Diverse Instructional Strategies and Utilization of Varied Teaching Resources on the Academic Performance of Bachelor of Science in Industrial Security Management Students in Higher Education Institutions

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ABSTRACT

Background: The implementation of effective instructional strategies, together with the use of appropriate teaching resources, plays a significant role in enhancing students' academic performance.

Aims: The study aims to identify which instructional approaches and educational materials most effectively support learning outcomes, and which may require enhancement or replacement. Establishing these relationships, the study intends to provide actionable recommendations for curriculum refinement that align with industry expectations and evolving educational standards.

Methods: This study employed a quantitative descriptive-correlational design involving 250 selected BSISM students during the second semester of the 2024–2025 academic year at a higher education institution in Misamis Occidental. Data were collected using a validated researcher-made questionnaire, while academic performance was measured via General Weighted Average (GWA).

Statistical Analysis Used: Descriptive statistics (mean, standard deviation), Pearson r correlation, and regression analysis were used in analyzing the data.

Results: Results indicate that instructional strategies were rated highly effective, particularly in content delivery, technology and simulation, and formative assessment. Teaching resources also have highly effective ratings, with strong evaluations for instructional materials, laboratory access, technological tools, and industry-based resources. Students' academic performance was generally placed most in the "Above Average" category. Correlation analysis revealed significant positive relationships between instructional strategies and performance, while teaching resources similarly contributed to academic performance.

Keywords: Academic Performance; General Weighted Average; Instructional Strategies; Learning Resources; Pedagogical Methods; Highly Effective; Educational Materials; Curriculum Refinement; Diverse; Utilization; Higher Education Institutions.

1. Introduction

The Bachelor of Science in Industrial Security Management (BSISM) is an academic program designed to prepare students with the knowledge and understanding of security, the various types of security operations and functions, and the considerations for the general application of security (CMO No. 6, Series 2018). This program includes professional courses such as Fundamentals of Industrial Security Management, Cybercrime, Information, physical and personnel security, Emergency Planning, Disaster Management, Investigation and Intelligence etc. that can equips learners with the theoretical knowledge and practical skills necessary to address threats in both private and public security settings (CMO No. 6, Series 2018). Given the critical importance of producing highly skilled security professionals in the Philippines, the Bachelor of Science in Industrial Security Management (BSISM) demands ongoing evaluation and refinement.

In the Philippine institutions its growing relevance in addressing both educational and community needs. Kirab et al., (2024) found that introducing the BSISM program at Sultan Kudarat State University–Palembang effectively empowered local youth, mitigated underemployment, and addressed gender imbalances in traditionally male-dominated fields. Complementing this, a market needs assessment in a state-funded Philippine college highlighted

how alignment with CHED's CMO No. 6, Series of 2018 ensures academic quality while enabling institutions to innovate to fit their specific outcomes (Baldonado & Tenorio, 2022). These studies affirm that a responsive and context-sensitive evaluation of the BSISM curriculum is vital not only for meeting evolving security sector demands but also for advancing equitable access to education and promoting community development.

Moreover, in higher education, instructional strategies and teaching resource materials serve as fundamental components in shaping student engagement, comprehension, and academic achievement (Chisunum & Nwadiokwu, 2024). Integrating technology-enhanced simulations, practical applications, and hands-on training significantly improves students' ability to connect theoretical knowledge to real-world practice in professional programs like BSISM (Sajedinejad et al., 2023).

Likewise, the availability and quality of teaching materials ranging from textbooks and digital content to simulation tools greatly influence students' ability to grasp complex security and criminal justice concepts (Bracewell et al., 2022; Zhang & Kennedy, 2021). When instructional approaches are aligned with appropriate resources, they foster deeper understanding, critical thinking, and improved performance among learners (Meng, 2023). Thus, evaluating the effectiveness of both strategies and materials is necessary to enhance educational delivery and optimize student outcomes in the BSISM program.

However, despite the recognized importance of effective instruction and quality materials, several issues persist in the implementation of the BSISM curriculum. Some instructors continue to rely on traditional lecture-based methods that limit student interaction and practical skill development (Nawabi & Javed, 2021). In addition, outdated teaching materials, limited access to modern security technologies, and insufficient contextualization of content hinder students from acquiring competencies relevant to today's security landscape (McKinley, 2022). These gaps create a disconnect between academic instruction and the actual demands of the industrial security field (McKinley, 2022). Addressing these instructional deficiencies is crucial to ensuring that the BSISM program produces graduates who are both academically prepared and field-ready.

As a result, academic performance serves as a key indicator in evaluating the effectiveness of any educational curriculum, including the BSISM program (Kumar & Agarwal, 2021). It reflects not only students' mastery of knowledge and skills but also the quality of instruction and relevance of teaching materials used in the learning process (Kusmawan et al., 2025). When students consistently perform well, it suggests that the curriculum content, delivery strategies, and resources are aligned with desired learning outcomes (Hwa et al., 2020). Conversely, low academic achievement may point to gaps in pedagogy, resource availability, or curriculum design (Bone & Ross, 2021). Therefore, assessing students' academic performance offers valuable insights into how well the BSISM curriculum supports meaningful and outcome-based learning. Despite growing interest in instructional innovation in Philippine higher education, research remains limited in the field of industrial security education. The BSISM program combines theoretical and practical competencies, yet there is a lack of empirical studies evaluating whether current teaching strategies and instructional materials meet industry demands. Additionally, the link between instructional approaches and student performance in BSISM remains underexplored. This gap underscores the need for focused research to assess instructional effectiveness and guide curriculum improvement in industrial security programs.

In this regard, and given the evolving demands of the industrial security profession and the critical role of education in preparing future practitioners, a thorough evaluation of the instructional strategies and teaching resource materials used in the BSISM curriculum is both timely and necessary (Jung & Lee, 2020). Identifying which approaches and materials effectively support student learning and which fall short this study aims to provide empirical evidence that can inform targeted curriculum improvements (Gouëdard, et al., 2020). The findings will serve as a basis for enhancing pedagogical practices, updating instructional tools, and aligning course content with industry standards and student needs (Abdiyev et al., 2023). The study seeks to help institutions produce graduates who are not only academically competent but also professionally equipped to meet real-world security challenges (Majewska, 2023). Through this evaluation, the research contributes to strengthening the overall quality and responsiveness of the BSISM program in higher education.

Accordingly, the purpose of this study is to evaluate the instructional strategies and teaching resource materials utilized in the Bachelor of Science in Industrial Security Management (BSISM) program and examine their relationship to students' academic performance. Specifically, the study aims to identify which instructional approaches and educational materials most effectively support learning outcomes, and which may require enhancement or replacement. Establishing these relationships, the study intends to provide actionable recommendations for curriculum refinement that align with industry expectations and evolving educational standards.

Finally, this study holds significance for multiple stakeholders in the field of criminal justice education. For curriculum developers and academic institutions, it offers evidence-based insights to enhance instructional delivery and resource allocation. Educators benefit from a clearer understanding of which methods and materials are most effective in promoting student learning and performance. Policymakers and school administrators can use the findings to inform policy and program adjustments that ensure relevance and quality in industrial security education. Ultimately, students stand to gain from an improved academic environment that fosters both academic excellence and real-world readiness.

1.1. Statement of the Problem

This study aimed to determine the instructional Strategies, Teaching Resources effect on the student's academic performance in industrial security management studies. It specifically aimed to answer the following questions:

1) What is the level of effectiveness of the instructional strategies of BSISM education in terms of content delivery method, use of technology and simulation; practical application and hands on training, assessment for Learning?

2) What is the level of effectiveness of the teaching resources of BSISM education in terms of availability of instructional materials, access to laboratory and practical equipment, technological tools and infrastructure, integration of industry-based resources?

3) What is the level of a student's academic performance in terms of their academic grades?

4) Is there a significant relationship between the level of effectiveness of instructional strategies and student's academic performance?

5) Is there a significant relationship between the level of effectiveness of teaching materials and a student's academic performance?

6) Which among the independent variables predict singly or in combination with the students' academic performance?

Null Hypothesis:

Ho_1: There is no significant relationship between the level of effectiveness of instructional strategies towards student's academic performance.

Ho_2: There is no significant relationship between the level of effectiveness of teaching materials towards a student's academic performance.

Ho_3: There is no independent variable that significantly predict, either singly or in combination, the students' academic performance.

2. Literature Review

Theoretical Framework

This study is anchored on the following theories: Sociocultural Theory of Vygotsky (1930-1934), Resource-Based Learning by Todd (1990), and Bloom's Taxonomy Theory by Bloom (1956).

Sociocultural Theory by Vygotsky (1930-1934) emphasized that learning is a socially mediated process in which individuals construct knowledge through interactions with more knowledgeable others and engagement with culturally meaningful tools, particularly language (Margolis, 2020). Central to this theory is the Zone of Proximal Development (ZPD), which represents the range of tasks a learner can perform with appropriate guidance but not yet independently this is a methodological framework defining the difference between a child's actual developmental level as determined by independent problem solving and the child's potential development as determined through problem solving under adult guidance or in collaboration with more capable peers according to Vygotsky (1978).

This is primarily concerned with social and participatory learning and refers to the space between what a child can do on their own and what they can do with help from someone more capable (Ness, 2023). With this concept, it is believed that students' independent learning process can lead them to the next level in their respective zone of potential development. From this process, the zone of potential development will become the students' zone of actual development, through which the students will enter their next zone of potential development, and so forth (Lasmawan & Budiarta, 2020).

Sociocultural Theory was particularly useful in this study, as it helps explain how a teacher's instructional strategies can develop academic performance among Industrial Security Management (ISM) students. According to the theory, challenging tasks in this zone promote maximum cognitive growth, helping learners stretch their current abilities with appropriate support (McLeod, 2024). In Industrial Security Management Education, the competent adults (teachers) who take the initiative to impart education through guidance and encouragement in problem

solving settings and adapt their level of help according to the requirement of the student and motivate them by placing in a challenging situation above their level to make them reach a level beyond the current zone, by exercising their full potential. The theory suggests that the teacher's instructional strategies bridge the gap between current and potential ability. What a learner does with help today, they will be able to do independently tomorrow, leading to increased academic performance.

The effectiveness of Vygotsky's Sociocultural Theory in enhancing academic outcomes through socially mediated instruction. Maghanoy et al. (2024) conducted a case study integrating sociocultural theory into online instruction for senior high school students, finding that socially mediated design fostered enhanced engagement, improved learning outcomes, and strengthened a sense of community, highlighting the value of collaborative digital learning. In the realm of technology-mediated simulation, Grepon and Martinez (2021) developed a virtual reality campus simulation for Bukidnon students, achieving excellent usability and enabling learners to engage with spatial content through an immersive, hands-on experience. Moreover, De Torres's (2022) assessment of mobile learning readiness revealed high levels of device availability, skill, and psychological preparedness among university students, supporting mobile-mediated, student-centered instructional delivery. Complementing these, Grajo et al. (2025) examined scaffolding and ZPD in reading instruction and found significant proficiency gains through collaborative, linguistically appropriate teaching strategies anchored in sociocultural principles.

Resource-Based Learning (RBL) by Todd (1990) is an educational approach that emphasizes students' active engagement with a variety of resources, such as digital tools, peer interactions, and self-directed materials, to facilitate deeper learning. (Rumahlatu et al., 2021). RBL encourages students to take ownership of their learning by selecting and utilizing resources that cater to their individual needs and learning styles, thereby promoting autonomy and intrinsic motivation (Yaniawati et al., 2020). The integration of technology and collaborative tools within RBL environments further enhances accessibility and engagement, making learning more personalized and relevant to real-world contexts (Wessels et al., 2021).

Resource-Based Learning is significant to this study as it explains how the teaching resources positively impact students' academic performance by fostering critical thinking, creativity, and digital literacy. Research indicates that RBL strategies, such as the use of digital platforms and collaborative tools, enhance students' engagement with content, thereby improving learning outcomes (Yaniawati et al., 2020). Additionally, RBL promotes self-regulation and metacognitive skills, which are crucial for academic success in dynamic learning environments (Rumahlatu et al., 2021). By providing students with the autonomy to explore and use diverse resources, RBL not only enhances academic performance but also prepares learners for lifelong learning in an increasingly complex, information-rich world (Wessels et al., 2021).

Resource-Based Learning (RBL), as conceptualized by Todd (1990), enhances academic performance when students have equitable access to diverse and contextual learning resources. Christopher and Leemarc (2021) found that students exposed to RBL strategies, where learners engaged with various instructional materials and activity-based learning tools, performed significantly better than those taught through traditional lecture-based methods. Rabanes and Paglinawan (2025) further found that the availability of instructional materials, including

textbooks, visual aids, and worksheets, positively affected students' behavioral, cognitive, and affective engagement in science classes, which, in turn, contributed to improved academic outcomes. Despite this, their study also noted limited access to laboratory equipment in many schools, which constrained opportunities for experiential learning. In higher education, Inarda (2023) developed outcomes-based print modules tailored for business students and found that well-aligned and readily available instructional resources promoted independent learning and boosted academic achievement.

Bloom's Taxonomy (1956) is a hierarchical classification of cognitive learning objectives that educators use to design effective learning experiences and assessments. Additionally, this theory is widely used to help structure curriculum content, learning activities, and evaluation methods, aiming to promote higher-order thinking and deeper understanding among students (Bloom, 1956). As stated by Jaiswa & Al-Hattami (2020), Bloom's Taxonomy of Educational Objectives provides a hierarchical classification system that classifies thinking abilities from basic information inquisition to more complex processes

Bloom's Taxonomy Theory is highly relevant to this study, as it serves as a guide for evaluating students' academic performance. Additionally, this focuses on the inherent relationship between learning approach and outcomes. Research indicates that when teaching methods are designed to engage students at various cognitive levels, students demonstrate improved retention, critical thinking, and problem-solving skills (Arifin et al., 2020). Prasad (2021) evaluated student performance using Bloom's Taxonomy and found that assessments aligned with higher-order thinking skills led to better student outcomes. Additionally, integrating diverse teaching resources, such as digital tools and collaborative activities, facilitates active learning and deeper engagement. This approach not only improves academic performance but also prepares students for complex real-world challenges by promoting higher-order thinking and problem-solving abilities.

Bloom's Taxonomy has long served as a foundational framework in instructional design, offering a hierarchical classification of cognitive learning objectives from lower-order thinking skills (remembering, understanding) to higher-order skills (analyzing, evaluating, and creating). Almerino et al. (2021) analyzed the alignment of teachers' instructional objectives with Bloom's Taxonomy. They found that while most educators focused on lower-order thinking skills, students performed better when exposed to lessons that targeted higher-order skills, such as analysis and evaluation. Similarly, Dela Cruz and Arcilla (2023) explored the integration of Bloom's cognitive domain in science instruction. They concluded that the use of task-based strategies aligned with higher levels of the taxonomy significantly improved students' problem-solving and critical thinking performance.

Conceptual Framework

This study examines the relationship between instructional strategies, teaching resources, and the academic performance of Bachelor of Science in Industrial Security Management students. Instructional strategies and teaching resources serve as the independent variables, while academic performance is the dependent variable.

Instructional Strategies are methods, techniques, or approaches educators use to facilitate student learning and ensure the achievement of learning outcomes. These strategies include content delivery methods, technology and simulation, practical application and hands-on training, and assessment for learning to engage students and promote

deeper understanding of the subject matter. Hill and Jordan (2022) define instructional strategy as the instructional materials and procedures that enable students to achieve the learning outcomes. Moreover, instructional strategies used by classroom teachers and how their use affects students' academic achievement (Thomas & Green, 2015). Additionally, a strategy to set up a framework for maximizing effective and efficient learning (Hill & Jordan, 2022)

Content Delivery Methods refer to the ways educational content is conveyed from instructors to students, shaping the learning experience and engagement. According to White et al. (2019), student learning is consistent across modes of content delivery. However, students' viewing habits had a significant impact on learning. Furthermore, student engagement, rather than the mode of content delivery, is a determinant of student learning and performance (White et al., 2019). Content delivery methods play a key role in student learning. To increase student productivity and performance, instructors need to incorporate a variety of techniques (Hodge et al., 2024)

Technology and Simulation encompass leveraging digital tools to enhance student engagement, motivation, and learning outcomes by providing interactive, visual, and adaptive experiences. According to Labana & Labitad (2024), traditional teaching approaches may arouse enthusiasm, but they cannot adequately develop critical thinking or prepare students for real-world applications. Furthermore, their study concluded that integrating technology-based instructional strategies in teaching significantly enhanced academic performance and positive attitudes towards the subject. (Labana & Labitad, 2024). Technology integration has become popular in education, and as teachers, we are always looking for ways to effectively utilize technology tools in our classrooms. It can serve as a technique to enhance learning and increase a student’s interest and awareness of the topic being discussed (Coffman, 2023).

Practical Application and Hands-on Training refer to teaching strategies that emphasize active student engagement through direct experience and real-world tasks. A hands-on approach is a method of instruction in which students are guided to gain knowledge through experience. This means allowing the students to manipulate the objects they are studying (Ekwueme et al., 2025). Haury and Rillero (2025) posit that a hands-on learning approach engages students in a comprehensive learning experience, thereby enhancing their critical thinking. It is obvious, therefore, that any teaching strategy that is skilled towards this direction can be seen as an activity-oriented teaching method (Hands-on-approach). Hands-on learning is an activity in which students use their psychomotor skills and learn and gain a better understanding of them through experience (Thiri, 2024). Therefore, a Hands-on Approach has been proposed to increase students’ academic achievement and understanding (Ekwueme et al., 2015).

Assessment for Learning (AfL) is an instructional approach that integrates assessment into the teaching process to provide continuous feedback, enabling teachers to adjust instruction and students to regulate their learning (Van der Kleij et al., 2024). Unlike summative assessment, which measures outcomes at the end of instruction, AfL uses strategies such as questioning, peer assessment, and self-reflection to improve learning as it occurs (Liu et al., 2022). According to Van der Kleij et al. (2024), AfL positively influences academic performance. Similarly, teachers who applied AfL in their teaching enhanced learners' higher-order thinking skills and academic scores (Mmolai et al., 2022).

Teaching Resources are resources that an instructor may use to help achieve desired learning objectives and to facilitate the learning process. Broadly, the term refers to a spectrum of educational materials to achieve specific

learning objectives. These include instructional materials, laboratory and Practical Equipment, Technological Tools and Infrastructure, and integration of industry-based resources. Additionally, according to Kapur (2019), these are the tools that teachers and instructors use in schools to facilitate students' learning and understanding of concepts. These are the educational materials used in the classroom to support the learning objectives set out in the lesson plan. Adequate teachers, classrooms, textbooks, libraries, laboratories, and desks as teaching and learning resources that influence students' academic performance in examinations (Somba et al., 2022).

Availability of Instructional Materials refers to the extent to which teaching and learning resources, such as textbooks, visual aids, digital content, and hands-on tools, are provided and accessible to both teachers and students to support effective instruction. However, research shows that mere access does not guarantee effective use. Irambona and Chang'ach (2023) observed that in Burundi, the limited use of audiovisual materials led to only moderate improvements in student performance, largely due to inadequate teacher training. Similarly, Amos et al. (2022) found that instructional materials, when well-aligned with curriculum and student needs, significantly enhanced learner engagement in Ghanaian basic schools. Rice and Ortiz (2021) further emphasized the importance of the 4A Framework, Accessible, Engaging, Inclusive, and Accountable, in designing digital instructional materials, advocating for inclusive and participatory use in diverse classrooms.

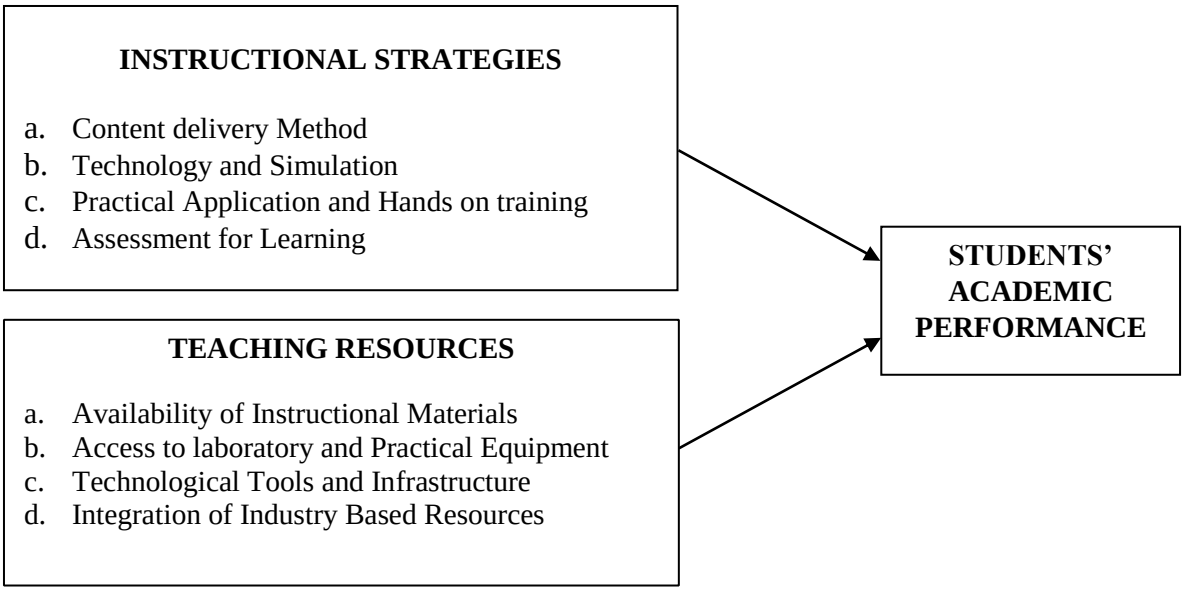
Access to laboratory and Practical Equipment refers to the availability and usability of tools, instruments, and facilities that enable students to conduct hands-on experiments, apply theoretical knowledge to real-world problems, and engage in other activities in subjects such as science, engineering, and technology. Access to laboratory and practical equipment is pivotal in developing students' scientific and technical competencies. In many under-resourced educational systems, however, the lack of functional lab tools hinders experiential learning. Innovative alternatives such as smartphone-based physics labs have shown promise; for instance, Leuenberger et al. (2025) demonstrated that these low-cost tools significantly improved students' conceptual understanding and motivation. Likewise, Kaleem et al. (2024) reported that IoT-enabled remote laboratories increased student engagement and performance in engineering education, especially in rural areas. Wenzel (2022) also highlighted the role of DIY and open-source laboratory equipment in promoting hands-on learning in resource-limited settings, advocating for localized, low-cost innovation.

Technological Tools and Infrastructure refer to the hardware (like computers, tablets, and projectors), software (such as learning management systems and educational apps), and network systems (including internet access and servers) that support the integration of technology into teaching, learning, and school management. Technological tools and infrastructure, including devices, connectivity, and digital platforms, are critical enablers of modern teaching and learning. When effectively integrated, they support personalized learning, digital literacy, and remote access.

Rice and Ortiz (2021) emphasized that digital materials should meet the 4A criteria to ensure inclusive and accessible instruction, especially for students with diverse needs. Moreover, the growing adoption of mobile learning (M-learning) has enabled continuous, interactive, and location-independent education (Wikipedia, 2025). However, inequities in infrastructure, such as unstable internet or insufficient devices, remain key barriers to realizing the full potential of technology-enhanced learning, particularly in rural or disadvantaged regions.

Integration of Industry-Based Resources refers to incorporating tools, knowledge, practices, and partnerships from industry into the educational process to enhance relevance, skill development, and job readiness. Integration of industry-based resources such as internships, expert collaboration, and access to industry-grade tools enhances curriculum relevance and student readiness for the workforce. Cloud laboratories, for example, are emerging tools that simulate real-world lab experiences by providing remote access to automated equipment. According to recent findings (Wikipedia, 2025), platforms such as Emerald Cloud Lab and Strateos enable academic users to run real experiments with professional-grade tools, thereby aligning educational practice with industry standards. These integrations not only enrich practical learning but also foster innovation and adaptability, preparing students to meet the dynamic demands of the labor market.

Schematic Diagram of the Study


INSTRUCTIONAL STRATEGIES
a. Content delivery Method
b. Technology and Simulation
c. Practical Application and Hands on training
d. Assessment for Learning
TEACHING RESOURCES
a. Availability of Instructional Materials
b. Access to laboratory and Practical Equipment
c. Technological Tools and Infrastructure
d. Integration of Industry Based Resources
STUDENTS' ACADEMIC PERFORMANCE

Student's Academic Performance refers to the measurable outcomes of learning, typically indicated by grades, test scores, and other standardized or teacher-based evaluations that reflect the extent to which educational objectives have been achieved (Kpolovie et al., 2020). It encompasses both cognitive outcomes, such as knowledge acquisition, comprehension, and problem-solving, and, in some contexts, non-cognitive skills, such as engagement and persistence, that influence learning outcomes (Zhang & Aasheim, 2021). Academic performance serves as a key indicator of educational effectiveness. It is often used in research to evaluate the impact of instructional strategies, learning environments, and assessment practices on student learning outcomes.

3. Methods

Design

The study utilized a quantitative approach, specifically a descriptive-correlational design, which aims to examine and describe the relationships among key variables without altering or controlling them. A quantitative approach using a descriptive-correlational design is suited for this study as it allows the measurement of instructional strategies, teaching resources, and academic performance in numerical terms and determines the degree and direction of their relationships without manipulating variables (Creswell & Creswell, 2018). This design is

appropriate in educational settings where experimental control is impractical, yet statistical analysis can provide empirical evidence on how pedagogical factors relate to student outcomes (Ary et al., 2019).

Setting

This research was conducted at a higher education institution offering the BSISM program, situated within a local government unit in Misamis Occidental, Philippines, in the northern region of Mindanao. The study site was chosen due to its strategic role in providing specialized education in Industrial Security Management, enabling an in-depth examination of how instructional strategies and teaching resources influence student learning outcomes in a real-world, local context.

Respondents

The study's respondents were the 250 students currently enrolled in the BSISM program during the 2024-2025 academic year. Criteria guide the selection of the participants: (1) Must be enrolled in the Bachelor of Science in Industrial Security Management program during the second semester of school year 2024-2025; (2) Preferably 2nd year and above during the second semester of school year 2024-2025. (3) Must have taken at least one core BSISM course. (4) Regular attendance and participation in academic activities.5) Must voluntarily agree to take part in the study. The researchers ensure that these criteria are met before proceeding with the interview phase.

Instruments

The following instruments were used in this study:

This research employed a researcher-made questionnaire as its primary tool for collecting data on the key variables.

Instructional Strategies section focuses on four constructs: content delivery method, technology and simulation, practical application and hands-on training, and assessment for learning, with five items per construct. Its purpose was to assess the use of these strategies and their relationship to students' academic performance. A pilot test with 250 non-participating respondents was conducted to ensure clarity and reliability, yielding a Cronbach's Alpha of 0.95, indicating excellent internal consistency. Minor revisions were made based on the pilot results, and a Likert scale was used to capture respondents' level of agreement.

Scale	Responses	Continuum	Interpretation
4	Strongly Agree (SA)	3.26 – 4.00	Highly Effective (HE)
3	Agree (A)	2.51 – 3.25	Effective (E)
2	Disagree (D)	1.76 – 2.50	Less Effective (LE)
1	Strongly Disagree (SD	1.00 – 1.75	Not Effective (NE)

Teaching Resources section consisted of twenty (20) items across four constructs: availability of instructional materials, access to laboratory and practical application, technological tools and infrastructure, and integration of industry-based resources, with five items per construct. The instrument aimed to assess the adequacy and effectiveness of teaching resources in supporting students' learning. To ensure validity and reliability, a pilot test was conducted with 250 respondents not included in the main study, and reliability was evaluated using Cronbach's Alpha, which yielded a value of 0.91, indicating excellent internal consistency. Minor revisions were made based on the pilot results to enhance the instrument's clarity and reliability. Responses were measured using a Likert scale.

Scale	Responses	Continuum	Interpretation
4	Strongly Agree (SA)	3.26 – 4.00	Highly Effective (HE)
3	Agree (A)	2.51 – 3.25	Effective (E)
2	Disagree (D)	1.76 – 2.50	Less Effective (LE)
1	Strongly Disagree (SD	1.00 – 1.75	Not Effective (NE)

Students' academic performance Academic performance was evaluated according to the college's grading system. Data from the students' GWA during the 2nd Semester of the School Year 2024-2025 were used. In analyzing the data, the following scales were used:

Grades	Interpretation
90–100	Outstanding Academic Performance
85–89	Above Average Performance (A
75–84	Below Average Performance (B)
Below 75	Poor Academic Performance (P)

Data-Gathering Procedure

Data collection commenced after the researcher obtained the necessary approvals and certifications from the Dean of the Graduate School. Following this, a formal request was submitted to the Dean of the College of Criminology to obtain permission to administer survey questionnaires to BSISM students. Upon receiving authorization, the researcher met with the selected respondents to explain the study's objectives and procedures. Informed consent was obtained from all participants, with emphasis on the voluntary nature of their involvement. Once participation was confirmed, the researcher coordinated the distribution schedule of the questionnaires based on the students' preferred dates and times. Each survey session was designed to last approximately 45 to 60 minutes. After collecting the completed questionnaires, the researcher carefully reviewed each one to ensure that all responses were complete. The data were then tallied, organized, and prepared for statistical analysis and interpretation. On the other hand, respondents' grades will be collected to identify students' academic performance. Consent must be obtained from the student and the registrar to collect the respondent's grade.

Ethical Considerations

This study placed strong emphasis on voluntary participation by respondents and strictly adhered to ethical standards. The researcher adhered to the university's ethical requirements and submitted the research for evaluation by the MU-Research Ethics Committee (MUREC). This process involved completing and submitting essential documents, including the Ethical Review Assessment, the Informed Consent Form, and a Technical Review of the Research Proposal. Participants were thoroughly informed about the study's objectives, procedures, and their rights. Informed consent was obtained before data collection to ensure that participants clearly understood the study and willingly agreed to participate. Before conducting the survey, the researcher secured an official approval letter from the Dean of the Graduate School. The purpose of the study was personally explained to the participants, who were also given ample time to decide whether or not to participate. Respondents were assured that they could decline to participate at any time without negative consequences. Should any concerns arise, the researcher was available to clarify the study's nature and procedures. Furthermore, the researcher complied with the provisions of Republic Act No. 10173, also known as the "Data Privacy Act of 2012," to ensure the protection of the respondents' personal data and privacy.

Data Analysis

The following statistical tools were used in the study:

The mean and standard deviation were utilized to calculate and analyze the instructional strategies, teaching resources, and academic performance of the students. The mean provided an average measure of students' perceptions and performance, while the standard deviation indicated the degree of variation or consistency among their responses.

The Pearson Product-Moment Correlation Coefficient (Pearson r) was used to determine the relationships between the effectiveness of instructional strategies and students' academic performance, and between the effectiveness of teaching resources and students' academic performance.

Regression analysis was used to examine how instructional strategies and teaching resources affect the academic performance of BSISM students.

4. Results and Discussions

Level of Effectiveness of the Instructional Strategies of BSISM Education

Table 1 presents the Level of Effectiveness of the Instructional Strategies of BSISM Education across four constructs: Content delivery method, Use of technology and simulation, Practical application and hands-on training, and Assessment for Learning, with a rating (M=3.41; SD=50), indicating a Highly Effective (HE) instructional strategy.

The content delivery method received the highest rating (M = 3.47, SD = 0.64), indicating high effectiveness (HE). This may be attributed to the structured and systematic presentation of lessons that enhances students' understanding of complex concepts and sustains engagement. Well-organized content delivery promotes clarity, logical flow, and active engagement, enabling students to connect theory with practice. Consistent with this finding, Kumar et al. (2021) reported that well-structured content delivery significantly improves learning and student satisfaction, while Montano (2025) highlighted that varied teaching techniques and effective content delivery enhance engagement and academic performance. Overall, effective content delivery contributes to improved comprehension and retention.

Assessment for Learning scored a highly effective rating (M =3.39, SD=0.45)**,** indicating highly effective (HE). The effective use of appropriate assessment tools to enhance student learning. Continuous formative assessments and regular feedback are integrated into instruction, enabling students to identify learning gaps and improve performance. Mendoza and Flores (2021) noted that formative assessment supports reflection and adjustment of learning strategies, while Reyes and Domingo (2023) emphasized that constructive feedback fosters self-regulated learning and academic growth. These findings underscore the role of assessment for learning in improving understanding, motivation, and overall academic achievement. Use of Technology and Simulation also achieved a rating of(M =3.39, SD= 0.45). Kaysi (2025) highlights that simulation applications not only improve academic achievement but also develop critical thinking, self-efficacy, teamwork, and communication skills, which are essential for professional success. Similarly, Talan (2020) supports the claim that simulation techniques positively

impact academic achievement across various subjects, with little variation in effectiveness. Additionally, Ouahi et al. (2025) show that integrating computer simulations into technical education improves knowledge acquisition and problem-solving skills, further boosting academic outcomes.

Practical Application and Hands-on Training achieved a rating of (M = 3.38, SD = 0.44), indicating that students benefit from experiential approaches that strengthen their applied skills. Consistent with the study of Dela Cruz and Morales (2020), experiential and practice-based learning significantly improves learners' professional readiness, especially in technical and vocational programs. Likewise, Villanueva and Santos (2022) found that incorporating hands-on exercises and field-based tasks enhances student learning outcomes and retention.

The overall high effectiveness rating (M = 3.41, SD = 0.50) for BSISM instructional strategies verifies that an integrative approach combining content delivery, technology use, practical training, and formative assessment effectively supports academic performance. These strategies, taken together, create a robust learning environment that addresses the cognitive, social, and practical dimensions, consistent with Vygotsky's sociocultural theory. The theory underscores the importance of social interaction, scaffolding, and mediated learning within the learner's zone of proximal development, as evidenced in the applied and collaborative learning modalities of BSISM education.

The results indicate that the instructional strategies employed in the BSISM program are highly effective, particularly in content delivery, the use of technology and simulations, practical application, hands-on training, and assessment for learning. This means that students are benefiting from diverse and engaging teaching methods that cater to different learning styles, enhance understanding, and promote skill development. The high effectiveness ratings imply that continued use and further refinement of these strategies could strengthen learning outcomes, improve academic performance, and better prepare students for professional practice in industrial security management.

Table 1. Level of Effectiveness of the Instructional Strategies of BSISM Education

Strategies	M	SD	Remarks
Content Delivery Method	3.47	0.64	Highly Effective
Use of Technology and Simulation	3.39	0.45	Highly Effective
Practical application and hands on training	3.38	0.44	Highly Effective
Assessment for Learning	3.39	0.45	Highly Effective
Overall	3.41	0.50	Highly Effective

Note: Scale: 3.25-4.0 (Highly Effective); 2.50-3.24 (Effective); 1.75-2.499(Less Effective); 1.0-1.74 (Not Effective).

Level of Effectiveness of the Teaching Resources of BSISM Education

Table 2 presents the level of effectiveness of the teaching resources in BSISM education with an overall mean of 3.40 (SD = 0.76), interpreted as highly effective. Although all indicators were rated highly effective, differences in ranking can still be observed. Technological Tools and Infrastructure and Integration of Industry-Based Resources obtained the highest mean score (M = 3.42), placing them as the top-ranked teaching resources that significantly support the learning process of students. This is followed by Access to Laboratory and Practical Equipment (M = 3.40), indicating that practical facilities are also effectively utilized in enhancing students' skills and learning

experiences. Meanwhile, Availability of Instructional Materials ranked the lowest with a mean score of 3.39; however, it still falls within the highly effective category, suggesting that instructional materials are sufficiently available but may still be improved to further support the teaching and learning process. Overall, despite the variation in ranking, all teaching resources were perceived to be highly effective in supporting BSISM education.

Access to high-quality instructional materials, such as textbooks, manuals, and digital content, equips students with essential knowledge and reinforces classroom instruction, promoting active engagement and cognitive development (Majewska et al., 2023). Additionally, well-structured materials tailored to course content positively influence comprehension and retention, especially in specialized fields, by providing multiple learning pathways (Kumar et al., 2021).

Access to laboratory and practical equipment, rated highly effective (M=3.40, SD=0.72), is vital for applied learning in BSISM education. Hands-on interaction with equipment allows students to link theory with practice, enhancing technical proficiency and problem-solving skills (Structural Learning, 2023). Practical exposure through well-equipped labs fosters experiential learning, which improves engagement, skill mastery, and academic outcomes (Rakap & Parlak, 2021).

Technological tools and infrastructure, also rated highly effective (M=3.42, SD=1.15). This highly effective rating reflects how the availability and proper use of technology enhance students' learning experiences, enabling them to engage with course content more interactively and apply knowledge in practical scenarios. Technical tools and infrastructure play an indispensable role in modern education by facilitating access to digital resources, simulations, and collaborative platforms (Chen et al., 2020). Strong technological infrastructure contributes to flexible and personalized learning experiences, boosting student motivation, interaction, and achievement (Almalki & Al-Shehri, 2021)

The integration of industry-based resources received a high effectiveness rating (M=3.42, SD=0.70), underlining the importance of contextualizing learning through real-world inputs such as industry partnerships, internships, and updated case studies. Close collaboration with industry enhances curriculum relevance, bridges the gap between academia and practice, and fosters students' readiness for employment (Kaysi, 2025; Majewska et al., 2023). Authentic learning environments increase student motivation and performance by aligning academic content with current industry standards, a critical factor in preparing BSISM graduates.

The overall effectiveness rating of 3.40 (SD = 0.76) indicates that diverse, accessible, and relevant teaching resources are crucial for academic success in BSISM education. This finding supports Resource-Based Learning (RBL) theory (Taylor, 1971), which emphasizes that learners achieve better outcomes when they can strategically engage with a variety of resources tailored to their needs. RBL encourages learner autonomy and active exploration, using instructional materials, practical equipment, technology, and industry inputs as key resources to foster meaningful, self-directed learning experiences.

The high effectiveness of instructional, technological, and industry-based resources implies that providing well-equipped materials, laboratories, and digital tools enhances students' learning, practical skills, and academic performance in the BSISM program. Furthermore, the application of RBL theory is reflected in the regression

analysis, which showed that instructional strategies and teaching resources significantly predict students' academic performance. This demonstrates that aligning teaching resources with RBL principles not only supports student engagement but also has a measurable positive effect on their academic outcomes, ultimately preparing them for professional success in industrial security management.

Table 2. Level of Effectiveness of the Teaching Resources of BSISM Education

Resources	M	SD	Remarks
Availability of Instructional Materials	3.39	0.46	Highly Effective
Access to Laboratory and Practical Equipment	3.40	0.72	Highly Effective
Technological Tools and Infrastructure	3.42	1.15	Highly Effective
Integration of Industry Based Resources	3.42	0.70	Highly Effective
Overall Effectiveness	3.40	0.76	Highly Effective

Note: Scale: 3.25-4.0 (Highly Effective); 2.50-3.24 (Effective); 1.75-2.499(Less Effective); 1.0-1.74 (Not Effective).

Level of Student's Academic Performance

The student academic performance in the Bachelor of Science in Industrial Security Management (BSISM) program shows a largely positive outcome, with an overall mean grade of 87.20%, which falls within the "Above Average" category. Specifically, 27.20% of students achieved an "Outstanding" academic rating (mean = 92.20%), 55.60% attained "Above Average" (mean = 87.0%), and 17.20% were categorized as "Below Average" (mean = 80.3%). This indicates that a substantial majority of students demonstrate strong academic achievement, reflective of effective instructional strategies and teaching resources within the program.

This distribution of academic performance highlights the effectiveness of quality curriculum delivery and resource availability as key predictors of student success in applied professional programs (Martinez et al., 2024). Security management and related disciplines have shown that clear course structure, ongoing formative assessments, and practical training significantly contribute to higher student academic outcomes (Gomez & Lee, 2022). Furthermore, the presence of a sizable number of students performing below average signals a need for targeted interventions to support struggling learners and ensure more uniform academic excellence.

Overall, the performance levels indicate that the BSISM program is successfully preparing students academically. Still, continuous improvement through differentiated instructional approaches and enhanced student support services may benefit the lower-performing subgroup by raising its performance (Naidoo & Khoza, 2021). These insights affirm the importance of integrating effective teaching practices and resources to sustain and improve academic quality in emerging fields such as industrial security management. Anchored in Bloom's Taxonomy, the findings emphasize the need for learning experiences that develop knowledge, application, and higher-order thinking skills, highlighting the importance of effective teaching strategies and resources in sustaining academic quality in industrial security management.

The overall performance of BSISM students, with a mean score of 87.20% and an overall rating of 4.37, indicates that the program is effectively fostering academic achievement, as most students fall within the Outstanding and Above Average categories. This suggests that the instructional strategies employed are largely successful in supporting learning outcomes. However, the presence of a Below Average subgroup highlights the need for

targeted interventions, such as differentiated instruction, additional support services, or remedial activities, to ensure all students can achieve higher performance levels. These findings imply that continuous evaluation and refinement of teaching strategies are essential for maintaining high academic standards and promoting equitable student success in the BSISM program.

Table 3. Level of Student's Academic Performance

Strategies	Frequency	Percentage	M	SD
Outstanding	68	27.20	92.20	1.98
Above Average	139	55.60	87.0	1.44
Below Average	43	17.20	80.3	3.31
Overall Performance			87.20	4.37

Note: Scale: 90-100 (Outstanding); 85-89 (Above Average); 75-84(Below Average); 74 and below (Poor).

Significant Relationship Between the Level of Effectiveness of Instructional Strategies and Student's Academic Performance?

Table 4 indicates a significant positive relationship between the effectiveness of various instructional strategies and students' academic performance in the Bachelor of Science in Industrial Security Management (BSISM) program. Specifically, assessment for learning shows a strong positive correlation ($r = .25$, $p < .001$), underscoring the critical role of ongoing formative assessment and feedback in enhancing student achievement. The content delivery method also shows a significant, though smaller, positive correlation ($r = .15$, $p = .02$), suggesting that a clear and effective presentation of course content supports better academic outcomes. Use of technology and simulation ($r = .24$, $p < .001$), as well as practical application and hands-on training ($r = .25$, $p < .001$), both show strong and highly significant correlations with academic performance, highlighting the importance of interactive and experiential learning modalities.

These findings emphasize the role of active instructional strategies as key facilitators of academic success. Awan (2024) found that instructional approaches fostering student engagement, critical thinking, and applied learning significantly improve academic performance across disciplines. Almalki and Al-Shehri (2021) documented that simulation-based learning enhances both knowledge retention and skills development, directly influencing academic success. Additionally, Rakap and Parlak (2021) highlighted the efficacy of hands-on training in solidifying understanding and improving practical skills, which, in turn, correlates with higher student achievement.

Thus, the significant correlations across these instructional strategies affirm their complementary roles in fostering an effective learning environment that promotes academic excellence in BSISM education. Educators are encouraged to maintain a balanced emphasis on well-structured content delivery, technological and simulation tools, assessment for learning, and practical training to optimize student learning outcomes.

The correlation analysis indicates significant positive relationships between all instructional strategies and students' academic performance. All showed statistically significant associations. These findings imply that the effectiveness of instructional strategies directly influences student learning outcomes, highlighting the importance of integrating formative assessments, interactive technologies, practical exercises, and clear content delivery into teaching

practices. Results further imply the need to continuously enhance and diversify instructional approaches to maximize academic performance, ensure engagement, and support the development of both theoretical knowledge and practical skills in BSISM education.

The findings support Sociocultural Theory**,** which emphasizes that learning occurs through interaction, collaboration, and practical engagement within a social and educational environment. When students actively participate in assessments, simulations, and hands-on activities, they are able to construct knowledge more effectively. Moreover, the results align with Bloom's Taxonomy**,** which highlights the progression of learning from basic knowledge to higher-order thinking skills such as application and analysis. Instructional strategies that involve practical application, technology use, and formative assessment allow students to move beyond simple understanding toward applying and demonstrating their knowledge, thereby enhancing their academic performance.

Table 4. Significant Relationship Between the level of effectiveness of instructional strategies and student's academic performance

Variables	***r* value**	***p* value**	**Decision**
Assessment for Learning	.25**	< .001	Reject Ho
Content Delivery Method	.15*	.02	Reject Ho
Use of Technology and Simulation	.24**	< .001	Reject Ho
Practical application and hands on training	.25**	< .001	Reject Ho

Ho: There is no significant relationship between the level of effectiveness of instructional strategies and student's academic performance.

*Note: Probability Value Scale: **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant).*

Significant Relationship Between the Level of Effectiveness of Teaching Resources and Student's Academic Performance

Table 5 reveals significant positive relationships between some teaching resources and student academic performance in the BSISM program, but not all of them. Specifically, availability of instructional materials ($r = .26$, $p < .001$) and access to laboratory and practical equipment ($r = .27$, $p < .001$) showed strong, highly significant correlations with academic performance, indicating that these resources are crucial to supporting student learning outcomes. Conversely, technological tools and infrastructure ($r = 0.09$, $p = 0.14$) and the integration of industry-based resources ($r = 0.11$, $p = 0.09$) showed no statistically significant relationships, suggesting that having technology or industry links alone does not automatically translate into better academic performance without effective utilization or integration.

These findings emphasize that the presence of high-quality instructional materials and well-equipped laboratories provides tangible, direct learning benefits by facilitating access to content and hands-on experiences that are essential in applied programs like industrial security management (Majewska et al., 2023). Access to practical equipment especially allows students to contextualize theory, build technical proficiency, and increase motivation (SmartLab Learning, 2025). However, studies also caution that technology's impact on academic success depends

heavily on how well it is integrated into pedagogy and supported by faculty, which may explain the nonsignificant correlations observed here (Chen et al., 2020). Similarly, industry-based resources must be meaningfully embedded within the curriculum and linked to student activities to realize academic benefits (Kaysi, 2025).

These results highlight that while teaching resources are foundational to student academic achievement, their effectiveness depends on accessibility, quality, and pedagogical integration. BSISM programs should therefore prioritize not only the provision but also the effective use and integration of instructional materials and practical equipment, alongside carefully designing technology and industry resource utilization to maximize student academic outcomes.

The correlation analysis reveals that the availability of instructional materials and access to laboratory and practical equipment have significant positive relationships with students' academic performance, indicating that these resources play a critical role in enhancing learning outcomes. In contrast, technological tools and infrastructure, and the integration of industry-based resources, showed no significant relationship, suggesting that simply having access to technology or industry connections may not automatically improve performance without effective utilization and integration into learning activities. These findings imply that institutions should prioritize ensuring adequate instructional materials and hands-on equipment while also developing strategies to maximize the practical use of technology and industry resources to further support student achievement in the BSISM program.

The results align with Resource-Based Learning Theory, which emphasizes that the availability and proper use of learning resources are essential for students to construct knowledge effectively. When students have access to instructional materials and practical equipment, they can engage in self-directed learning, experimentation, and skill development. Additionally, the findings reflect Bloom's Taxonomy, highlighting those effective resources support the progression from knowledge acquisition to application and higher-order thinking. Resources that are well-integrated into the learning process enable students to understand concepts, apply them in practical contexts, and enhance their overall academic performance.

Table 5. Significant Relationship Between the level of effectiveness of teaching resources and student's academic performance

Variables	*r* value	*p* value	Decision
Availability of Instructional Materials	.26**	< .001	Reject Ho
Access to Laboratory and Practical Equipment	.27**	< .001	Reject Ho
Technological Tools and Infrastructure	0.09	0.14	Do not reject Ho
Integration of Industry Based Resources	0.11	0.09	Do not reject Ho

Ho: There is no significant relationship between the level of effectiveness of teaching resources and student's academic performance.

*Note: Probability Value Scale: **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant).*

Predictors of Students' Academic Performance

The regression analysis in Table 6 reveals that among the instructional strategies assessed, only "Assessment for Learning" significantly predicts students' academic performance in the BSISM program (β = 2.29, p = 0.00),

explaining 5.6% of the variance in academic grades (adjusted R^2 = 5.60%). This indicates that for every unit increase in the effectiveness of assessment for learning, students' academic performance improves by approximately 2.29 points, controlling for other variables. The F-value of 14.72 (p = 0.00) confirms that the model is statistically significant overall.

This finding emphasizes the influential role of formative assessment practices in promoting academic success. Ongoing assessment with timely feedback enhances student engagement and learning outcomes by guiding instructional adjustments and encouraging self-regulated learning (Yan et al., 2022). Furthermore, the effectiveness of assessment for learning is often mediated by factors such as teachers' emotional and social support, which can enhance students' receptiveness to feedback and motivation to improve (Shen et al., 2024). Conversely, assessment for learning has positive potential; its predictive power on academic performance can be modest when other contextual factors are considered (McCallum & Milner, 2020).

This implies that incorporating continuous formative assessments and constructive feedback into instructional practices can meaningfully enhance students' academic outcomes. The regression equation (Academic Performance = 79.50 + 2.286 × Assessment for Learning) further suggests that improvements in assessment strategies directly translate into higher performance scores. Therefore, educators and institutions should emphasize effective assessment practices to support learning, reinforce understanding, and foster the development of critical skills essential for success in the BSISM program.

Table 6. Predictors of Students' Academic Performance

Predictors	Coef (β)	SE Coef		t- value	p-value
(Constant)	79.50	2.04		39.00	0.00
Assessment of Learning	2.29	.60		3.84	.00
Adjusted r^2	5.60%				
F value	14.72				
p-value	0.00				
Academic Performance = 79.50 + 2.286 Assessment for Learning					

5. Conclusion

The following were the conclusions of the study:

1) Effective teaching strategies, including technology use, practical activities, and interactive methods and assessments, help BSISM students learn better and develop important skills.

2) Well-resourced programs build practical skills essential for industrial security management students. Prioritizing such resources enhances program quality and student learning outcomes.

3) Strong learning outcomes are driven by effective instructional strategies and teaching resources.

4) Effective methods, particularly assessment for learning, content delivery, technology/simulation use, and practical training, directly enhance learning outcomes and grades. This strong correlation underscores the critical role of these targeted approaches in driving above-average academic success.

5) Some resources, such as technology tools and industry-based inputs, may not directly impact grades unless effectively integrated into teaching.

6) Regular assessments and feedback guide students' progress and improve academic performance.

5.1. Future Recommendations

The following were the recommendations of the study:

1) The program coordinator may consider enhancing instructional strategies by incorporating innovative content delivery methods and expanding the use of technology and simulation to further engage students and improve learning outcomes.

2) The school administration may invest in continuously updating and expanding teaching resources, including instructional materials, laboratory equipment, and technology infrastructure, while fostering partnerships with industry to keep resources relevant and up-to-date.

3) Faculty members may implement targeted academic support programs, such as tutoring and mentoring, for students performing below average to improve their grades and overall performance.

4) Educators may participate in regular professional development sessions focused on effective instructional strategies proven to boost student academic achievement.

5) The resource manager may ensure the consistent availability and accessibility of instructional materials and laboratory facilities to maximize their positive impact on student learning.

6) Instructors may focus on improving assessment for learning by adopting varied, timely, and feedback-oriented assessment techniques that better measure student progress and encourage academic success.

7) Future researchers may consider additional factors that influence academic performance in BSISM education, such as student motivation, learning styles, and faculty teaching experience.

Declarations

Declarations

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Competing Interests Statement

The authors declare no competing interests.

Consent for publication

The authors declare that they consented to the publication of this study.

Authors' contributions

All the authors conceptualized the study, conducted the interviews, performed data analysis, and prepared the manuscript.

Institutional Review Board Statement

Not applicable

Informed Consent

Informed consent was obtained from all participants prior to data collection.

Availability of Data and Material

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

Ethical approval for this study was obtained from the appropriate institutional ethics committee.

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Declaration of Artificial Intelligence

No AI tools were used in the preparation or writing of this manuscript.

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